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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,757	03/19/2004	Giorgio Ghislotti	UK03-004	7685
22928	7590	02/16/2005	EXAMINER	
CORNING INCORPORATED			MENEFFEE, JAMES A	
SP-TI-3-1			ART UNIT	
CORNING, NY 14831			PAPER NUMBER	
			2828	

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/804,757	Applicant(s) GHISLOTTI ET AL.	
	Examiner James A. Menefee	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/19/2004</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid (US 2003/0210720) in view of Tsang (US 4,512,022). See especially Figs. 3-4 and the discussion thereof of Reid, though the entire document is relevant.

Regarding claim 1, Reid discloses a semiconductor laser structure comprising an active layer 12 of high refractive index, on each side of the active layer are sublayers (see pars. [0026], [0054]), on each side of the sublayers are cladding layers 8,9,9' of low refractive index, and at least one trapping layer 1 inserted within one of the cladding layers.

The optical trapping layer 1 of Reid is thin compared with its distance from the active layer (i.e. the thickness of layer 9). To see what "thin" means, the examiner looks to the applicant's specification, where the trap layer is disclosed as up to 110 nm, while the distance from the active is 300-900 nm (see present specification, par. [0021]). While these limitations are not read into the claims, they give an idea of what is meant by "thin," and thin appears to mean,

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at the very least, being several times thinner than the distance from the active layer. Reid discloses the thickness of trap layer 1 is 50-250 nm, while the distance from the active layer (i.e. thickness of layer 9) is 100-700 nm. See Reid, par. [0059]. Thus it appears that Reid discloses that the trap layer is thin compared with its distance from the active layer. At the very least, the claimed range of being thin (i.e. several times thinner than the distance) overlaps with the prior art range. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). MPEP 2144.05.

Reid discloses the cladding layers 8,9,9' have substantially the same uniform refractive index. See Fig. 4 (n_8 , n_9 , and $n_{9'}$ are substantially the same and uniform).

It is not disclosed that the sublayers of Reid are graded index layers. While Reid refers to them as “sublayers” these layers are typically known in the art as guide layers. Tsang teaches a semiconductor laser with active layer 9 sandwiched between guide layers 7,11, sandwiched between cladding layers 5,13, similar to Reid. Tsang teaches that it is advantageous for the guide layers to have a graded index. See Fig. 2. It would have been obvious to one skilled in the art to make the guide layers with a graded index because this increases the optical confinement in the active layer, which provides for a low threshold current, as taught by Tsang. See abstract, col. 2 lines 25-31, col. 5 lines 11-13.

Regarding claims 2-4, Tsang teaches that the grading may be done such that the refractive index changes continuously, linearly, or parabolically. See Tsang Fig. 2.

Regarding claim 5, Reid discloses the trap 1 is formed on the side of the active layer that is nearest the substrate 11.

Regarding claim 6, as noted above the sublayers of Reid as modified by Tsang correspond to the graded index layers. The purpose of the grading is to provide a gradual increase from the refractive index of the surrounding cladding up to near the refractive index of the active layer. See Tsang Fig. 2. Therefore, the highest refractive index of the graded index layer will be about equal to the lowest refractive index of the active layer. Reid discloses the lowest refractive index of the active layer is 3.35, while the refractive index of the trap is 3.31. See par. [0054]. Therefore the refractive index of the trap is about equal to the highest refractive index of the graded index layers.

Regarding claims 7-8, these method steps are a method of forming the device having the limitations in claim 1, therefore the layers are disclosed as in the above rejection of claim 1. Further, electrodes 2,3 are applied, and the structure is cleaved to form mirrors. See Reid par. [0060]. Reid does not disclose the method of growth, therefore it is not disclosed that the layers are grown epitaxially, particularly the various epitaxial methods noted in claim 8. Tsang teaches that it is advantageous to grow the layers of a laser device by molecular beam epitaxy. See col. 4 lines 32-43. It would have been obvious to one skilled in the art to use molecular beam epitaxy in growing the device because it allows for easy growth of the graded layers, as taught by Tsang.

Regarding claim 9, Reid discloses ridge 15 is formed by pattern etching. See Fig. 3 and par. [0058].

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reid and Tsang as applied to claims 1-9 above, and further in view of Nishimura (US 5,488,507).

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Reid and Tsang disclose the limitations of parent claim 7 as shown above. Reid additionally discloses that the applying of the electrodes comprises the use of a patterned deposit of dielectric layer 4. This layer 4 corresponds exactly to the silicon nitride layer 13 which applicant discusses (see applicant's Fig. 9). Reid does disclose that the layer 4 may be a nitride, see par. [0043], but does not disclose it as silicon nitride. But it is well known in the art to include an insulating layer in this location on a laser having a ridge, and it is well known that such a layer may be a silicon nitride layer. See Nishimura Fig. 2, reference number 7, col. 3 lines 64-65. While not relied upon, see also other references cited in this action, noted under "Conclusion" below that show the same layer made of silicon nitride. The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07 and other cases cited therein. It would have been obvious to one skilled in the art to use silicon nitride as the insulating layer 4 of Reid. Reid contemplates the use of such a material by describing the layer as a nitride, and further the prior art shows that it was known in the art to use silicon nitride for layers located in the same exact place of similar ridge type lasers, therefore this is merely the selection of a known material based on its suitability for its intended use. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put in the last opening in a jig-saw puzzle." *Sinclair*, 325 U.S. at 335, 65 USPQ at 301.

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Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following disclose lasers having a similar optical trap layer as claimed: Nakayama (US 2004/0052282), Buda et al. (US 2004/0028104), and Takeuchi et al. (US 2003/0031220).

The following disclose a silicon nitride layer corresponding to applicant's and Reid's insulating layers: Yokouchi et al. (US 6,430,203, layer 7), Lee et al. (US 6,278,720, layers 17, 117), Ohkubo (US 5,832,018, layer 21), Takahashi et al. (US 5,727,015, layer 111).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James Menefee
February 8, 2005
JM